VERSION WITH MARKINGS TO SHOW CHANGES MADE

Page 1, paragraphs [0000.2] through [0002.5]:

[0000.2] CROSS-REFERENCE TO RELATED APPLICATIONS

[0000.4] This application is a 35 USC 371 application of PCT/DE 01/01406 filed on April 10, 2001.

[0000.6] BACKGROUND OF THE INVENTION

[0001] [Prior Art] Field of the Invention

[0002.5] Description of the Prior Art

Page 2, paragraph [0007]:

[0007] SUMMARY OF THE INVENTION

Page 3, paragraphs [0009] through [0011]:

[0009] A particular [type of] embodiment of the invention is characterized in that the support device is formed by an annular support disk, in particular comprising a metal material. The inner circumference of the support disk, in the installed state, rests on the valve element and closes the gap between the valve element and the injector housing.

[0010] A further particular [type of] embodiment of the invention is characterized in that the support disk is embodied as slightly conical on its inner circumference. By its conical embodiment, the support disk is given a spring action, which has proved advantageous at extreme pressures, especially upon load changes. Upon an axial pressure stress, the support disk stretches elastically in the radial direction and tightly closes the gap between the valve element and the injector housing.

[0011] A further particular [type of] embodiment of the invention is characterized in that the slightly conically embodied inner circumference of the support disk narrows toward the sealing element or away from the sealing element. In practice it has been found that the advantageous effects of the support disk of the invention occur not only when the inner circumference of the support disk tapers toward the sealing element but also if the inner circumference of the support disk tapers away from the sealing element. This aspect of the invention could not have been expected, without recognition of the significance of the spring action of the support disk.

Page 4, paragraphs [0012] through [0014]:

[0012] A further particular [type of] embodiment of the invention is characterized in that the support disk is embodied slightly conically on its inner and outer circumference. By the embodiment of the support disk as a double cone in cross section, the support disk is given a stronger spring action. The double cone can be mounted with its tip pointing toward or away from the sealing element.

[0013] A further particular [type of] embodiment of the invention is characterized in that leakage grooves are embodied in the support device. By means of the leakage grooves, an intentional leak between the support device and the injector housing is brought about. As a result, slight leakage flows that pass through the sealing element can be removed. This offers the advantage that a pressure cushion cannot build up between the sealing element and the support device. Such a pressure cushion could in fact cause the sealing element to shift undesirably in the axial direction.

[0014] A further particular [type of] embodiment of the invention is characterized in that the leakage grooves are provided on the side of the support device remote from the sealing element. This prevents the sealing element from being pressed into the leakage grooves during operation and thereby closing the leakage grooves.

[0014.5] BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Further advantages, characteristics and details of the invention will become apparent from the ensuing description, in which various exemplary embodiments of the invention are described in detail in conjunction with the [drawing. The characteristics recited in the claims and mentioned in the description can each be essential to the invention individually or in arbitrary combination with one another.] drawings, in which:

[0016] [Drawing]

[0017] [Shown in the drawing are:]

[0018] Fig. 1[, the] is a fragmentary elevation view of a longitudinal section through an injector of the invention, with a built-in support disk;

[0019] Fig. 2[,] is a plan view of a support disk with leakage grooves[, in plan view];

[0020] Fig. 3[, the elevation view of a section] is a sectional view taken along the line III-III in Fig. 2; and

[0021] Fig. 4[, the] is an elevation view taken in the direction of arrow IV in Fig. 2.

Page 6, paragraphs [0022] and [0023]:

[0022] [Description of the Exemplary Embodiments] DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0023] In Fig. 1, a fragment of an injector of the invention is shown in longitudinal section. A complete longitudinal section through such an injector is shown in Fig. 1 of EP 0 604 915 B1[.], reference to which may be had for a fuller illustration of the environment of the invention. The injector serves to inject fuel, which is subjected to high pressure, into the combustion chamber of an internal combustion engine (not shown).

Page 7, paragraph [0029]:

[0029] By means of the leakage grooves [7,] 8, 9, 10 and [10] 11 made in the underside of the support disk 7, an intentional leak is brought about between the support disk 7 and the injector housing 1. Alternatively, it is also possible to make corresponding leakage grooves in the surface of the injector housing or of the valve element 2 toward the support disk 7. By means of the leakage grooves, it is assured that slight leakage flows, which pass through the soft sealing ring 6, can be removed toward the bottom.

Page 8, paragraph [0031]:

[0031] The foregoing relates to preferred exemplary embodiment of the invention, it being understood that other variants and embodiments thereof are possible within the spirit and scope of the invention, the latter being defined by the appended claims.

Page 11, abstract of the disclosure:

Abstract of the Disclosure

The invention relates to a common rail injector for injecting fuel in a common rail injection system of an internal combustion engine, having an injector housing [(1)], which communicates with a central high-pressure reservoir and in which a nozzle needle is axially displaceable in order to adjust the injection as a function of the pressure in a control chamber, and having a sealing element [(6)], which is disposed in an annular chamber [(3)] that is provided between a valve element [(2)] and the injector housing [(1)]. [To lengthen the service life, in] In addition to the sealing element [(6)], a support device [(7)] is disposed in the annular chamber [(3)] between the valve element [(2)] and the injector housing [(1)].

[(Fig. 1)]